

**CITY OF CHALLIS, PWS #7190013  
SOURCE WATER ASSESSMENT FINAL REPORT  
PART 1: SURFACE WATER ASSESSMENT**

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**February 8, 2001**



**State of Idaho  
Department of Environmental Quality**

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## Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the watershed characteristics.

This report, *Source Water Assessment for City of Challis, Idaho*, describes the public drinking water system, the zone boundaries of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The City of Challis drinking water system consists of one surface water intake structure along Garden Creek and four ground water sources, which will be detailed in another report. In August 1995 and March 1999, the system experienced levels of microbial bacteria contamination that exceeded the drinking water Maximum Contaminant Level, but no information was obtained as to whether the problem come from the distribution system, the surface water, or the ground water. The samples were taken from the distribution system. In terms of the total susceptibility score, the intake rates moderate for inorganic contaminants and volatile organic contaminants, and low for synthetic organic contaminants and microbial contaminants.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

Due to the fairly short time associated with the movement of surface waters, source water protection activities should be aimed at short-term management strategies with the development of long-term management strategies to counter any future contamination threats. A bridge crosses Garden Creek approximately one mile upstream of the intake structure. Any spills occurring on this bridge should be carefully monitored and cleaned up and the surface water intake should be taken off-line until the threat is past. Source water protection activities for mining should be coordinated with the appropriate state and/or federal agencies responsible for the regulation or cleanup of the mine. Depending on the nature and status of the mine, various agencies could include Idaho Department of Environmental Quality, the U.S. Environmental Protection Agency, the Department of Lands, the Bureau of Land Management, the U.S. Forest Service, or others.

A community with a fully-developed source water protection program will incorporate many strategies. For assistance in developing protection strategies please contact the Idaho Falls Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

# SOURCE WATER ASSESSMENT FOR CITY OF CHALLIS

## Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment areas, a map showing the entire watershed contributing to the delineated area, and the inventory of significant potential sources of contamination identified within the delineated area are included. The list of significant potential contaminant source categories and their susceptibility rankings used to develop this assessment is also attached.

### Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the intakes, and watershed characteristics.

### Level of Accuracy and Purpose of the Assessment

Since there are over 2,900 public water sources in Idaho that must be completed by May of 2003, an in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of this assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treating a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

## **Section 2. Conducting the Assessment**

### **General Description of the Source Water Quality**

The City of Challis, Idaho serves a community of approximately 1,073 people through 521 connections. The City of Challis is located along the Salmon River at the junction of Highway 93 and Highway 75 (Figure 1). The public drinking water system for the City of Challis is comprised of one surface water intake and four ground water sources. The surface water intake is located on Garden Creek.

The primary water quality issue currently facing the City of Challis and most surface water systems is that of possible bacterial contamination and the problems associated with managing it. Any accidental spill from the bridge located one mile above the intake could potentially contaminate the surface water and an emergency response plan should be developed to deal with this contingency.

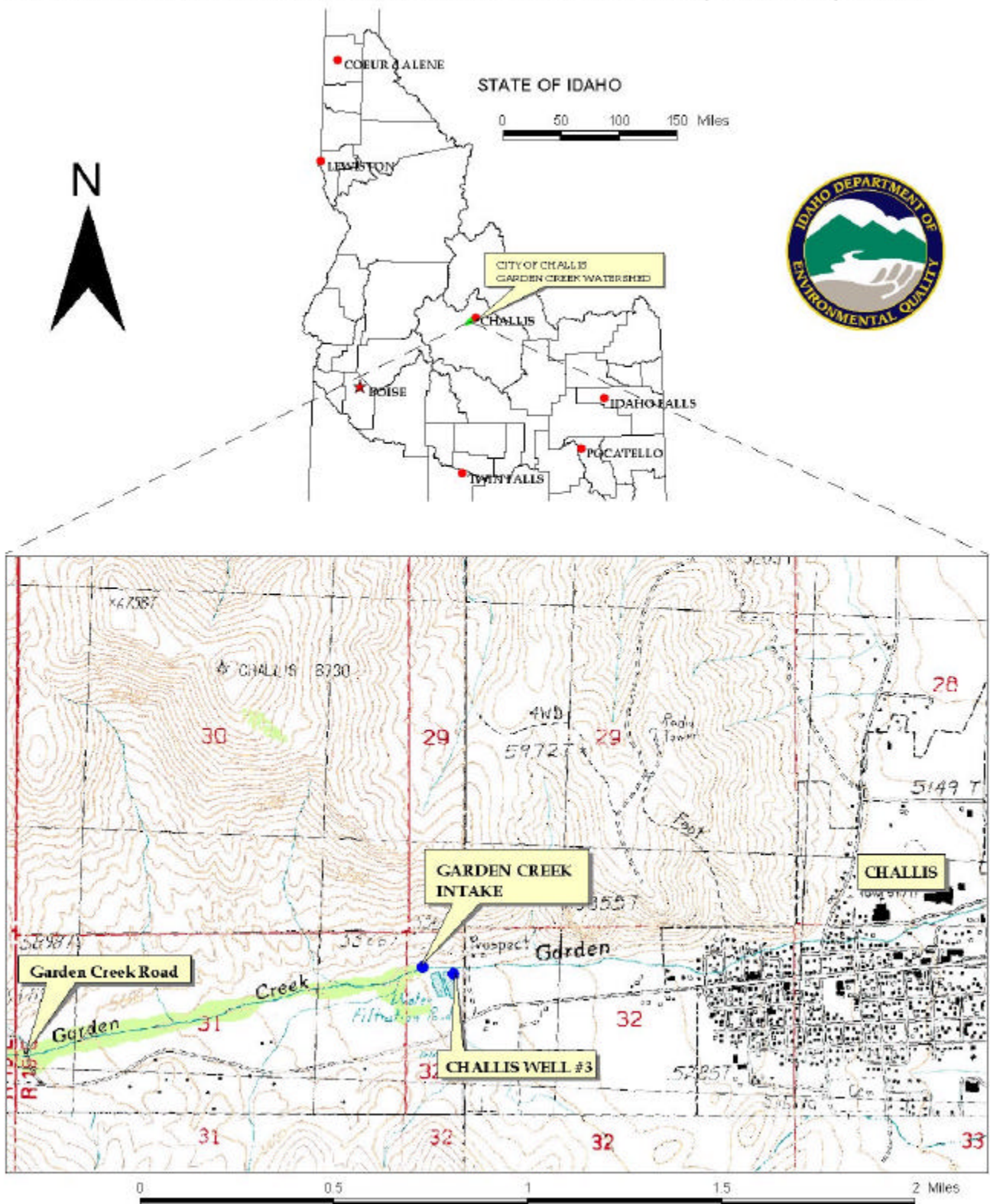
### **Defining the Zones of Contribution - Delineation**

To protect surface water systems from such potential contaminant pathways, the EPA required that the entire drainage basin be delineated upstream from the intake to the hydrologic boundary of the drainage basin (U.S. EPA, 1997b). This delineation is also referred to as a topographic delineation for systems consisting of small streams. The delineation process established the physical area around an intake that became the focal point of the assessment. Though the Garden Creek intake was not delineated with a topographic delineation, all the streams of the watershed upstream to their headwaters were delineated.

The EPA recognized that an intake on a large water body, such as Garden Creek, could have an extensive drainage basin. Therefore, the EPA recommended that large drainage basins be segmented into smaller areas for the purpose of implementing a cost-effective potential contaminant inventory and susceptibility analysis. The delineation process established the physical area around an intake that became the focal point of the assessment. The process included mapping the boundaries of the zone of contribution into a river buffer zone that extends from the intake upstream 25 miles or to the 4-hour streamflow time-of-travel boundary, whichever is greater. In the case of Garden Creek, the headwaters of the creek are reached after approximately 12 miles. This buffer zone also extends up tributaries to the remainder of the 25-mile boundary or the 4-hour time-of-travel boundary. The Garden Creek intake delineation is illustrated in Figure 2.

The delineated source water assessment area for the Garden Creek intake can best be described as a buffered area, 500 feet on either side of the river, extending upstream 12 miles to the headwaters, including stream reaches within the area. The actual data used by DEQ in determining the source water assessment delineation is available upon request.

FIGURE 1. Geographic Location & Topographic Watershed Delineation for the City of Challis



## **Identifying Potential Sources of Contamination**

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of surface water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

Land use within the City of Challis surface water delineated area consists predominantly of rangeland, some irrigated agricultural land, some forested land, rural residential homes, recreation, and mining facilities. Homes and businesses within the City of Challis surface water delineated area operate with individual septic systems.

It is important to understand that a release may never occur from a potential source of contamination, provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both, to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply intake.

## **Contaminant Source Inventory Process**

A contaminant inventory was conducted for the City of Challis system in September 2000. The process involved identifying and documenting potential contaminant sources within the City of Challis Source Water Assessment Areas through the use of computer databases and Geographic Information System maps developed by DEQ.

A total of seven (7) potential contaminant sites are located within the delineated source water area for the Garden Creek Intake (Table 1). Potential contaminant sources located within the delineated surface water area for the City of Challis include mine/prospect sites and Garden Creek Road (Figure 2).

Contaminants of concern consist of inorganic contaminants (IOCs) and volatile organic contaminants (VOCs) related to mineral extraction and IOCs, VOCs, synthetic organic contaminants (SOCs), and microbial contaminants related to an accidental spill from Garden Creek Road.

**Table 1. Garden Creek Intake Potential Contaminant Inventory**

SITE #	Source Description	Source of Information	Potential Contaminants <sup>1</sup>
1	Prospect – Fluorine	Database Search	IOC
2	Prospect – Lead	Database Search	IOC
3	Mine – Fluorine	Database Search	IOC, VOC
4	Prospect – Lead	Database Search	IOC
5	Prospect – Lead	Database Search	IOC
6	Prospect – Fluorine	Database Search	IOC
7	Mine – Lead	Database Search	IOC, VOC
	Garden Creek Road	Database Search	VOC, SOC, IOC, Microbes

<sup>1</sup>IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

### **Section 3. Susceptibility Analysis**

The susceptibility of the source at the intake was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity and construction of the intake, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each intake is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking.

#### **Intake Construction**

The construction of the City of Challis surface water intake directly affects the ability of the intake to protect the source from contaminants. The City of Challis drinking water system consists of four ground water wells and one surface water intake that produce water for domestic, business, and industrial uses. Water from the Garden Creek intake is processed through the treatment plant and then the water is manifolded to Well #3 ground water and the water is mixed before chlorination. Information regarding whether the intake was constructed properly and located in a way to minimize impacts was unavailable, leading to a high rating for the intake (Table 3).

#### **Potential Contaminant Sources and Land Use**

The City of Challis Garden Creek intake rated low susceptibility in terms of IOCs, VOCs, SOCs, and microbial contaminants. The water chemistry tests have detected the IOC fluoride, but at levels which have not exceeded the Maximum Contaminant Level (MCL) in accordance with the Safe Drinking Water Act. In August 1995 and March 1999, the system experienced levels of microbial bacteria contamination that exceeded the drinking water MCL, but no information was obtained as to whether the problem come from the distribution system or the surface water. Treatment efforts including slow sand filtration and gaseous chlorination have successfully prevented further occurrences.

## Final Susceptibility Ranking

Detections of IOC's above drinking water standard MCLs, a detection of total coliform bacteria, fecal coliform bacteria, or *E-coli* bacteria, or a detection of an SOC or VOC in a water chemistry test will automatically give a high susceptibility rating for an intake despite the land use of the area because a pathway for contamination already exists. The Garden Creek intake rates moderate for IOC's and VOC's, and low for SOC's and microbials. The large number of mines and Garden Creek Road are the major causes of this score. Any accidental spill from Garden Creek Road directly into the surface water could cause a potential problem and such an occurrence should be detailed in an emergency response plan.

**Table 2. Summary of City of Challis Susceptibility Evaluation<sup>1</sup>**

City of Challis Intake	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
	IOC	VOC	SOC	Microbial		IOC	VOC	SOC	Microbial
Garden Creek	L	L	L	L	H	M (H* <sup>2</sup> )	M (H*)	L (H*)	L (H*)

<sup>1</sup>H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

<sup>2</sup>H\* - Indicates source automatically scored as high susceptibility due to the presence of a potential contaminant source (Garden Creek Road bridge) suspended above the surface water.

## Susceptibility Summary

There are no current, long term, recurring water chemistry problems in the City of Challis surface drinking water system. The City of Challis Garden Creek intake rated low to moderate, with an automatic high score given for the presence of a potential contaminant source suspended above the source water, namely the Garden Creek Road bridge located approximately one mile upstream of the intake. The IOC fluoride has been detected in the water, but at levels below the MCL for drinking water.

The system has a treatment plant that uses slow sand filtration and a gaseous chlorine disinfection system that has prevented microbial contamination from affecting the drinking water since March 1999. Surface water systems are vulnerable to microbial contamination in general and continued treatment is important.



## **Section 4. Options for Source Water Protection**

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective source water protection program is tailored to the particular local source water protection area. A community with a fully-developed source water protection program will incorporate many strategies. For the City of Challis, source water protection activities should focus on environmental education with the community, recreational users, and businesses that operate within the vicinity of the delineation. Most of the delineated areas are outside the direct jurisdiction of the City of Challis. Due to the relatively short time involved with the movement of surface water, source water protection activities should be aimed at short-term management strategies with an emphasis on dealing with long-term future impacts from these same sources. A bridge crosses Garden Creek approximately one mile upstream of the intake structure. Any spills occurring on this bridge should be carefully monitored and cleaned up and the surface water intake should be taken off-line until the threat is past. Source water protection activities for agriculture should be coordinated with the upstream communities, the Idaho Department of Lands, the U.S. Forest Service, and other federal, state and local agencies with lands and jurisdiction within the delineated source water area. Source water protection activities for mining should be coordinated with the appropriate state and/or federal agencies responsible for the regulation or cleanup of the mine. Depending on the nature and status of the mine, various agencies could include Idaho Department of Environmental Quality, the U.S. Environmental Protection Agency, the Department of Lands, the Bureau of Land Management, the U.S. Forest Service, or others.

While the surface water source is only a part of the overall drinking water system, limitations and vulnerability related to the construction of the intake and the potential contaminant sources should be reviewed. An investigation of the feasibility of a complete shift to ground water sources to replace the current surface water system should be considered.

## **Assistance**

Public water suppliers and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Idaho Falls Regional DEQ Office      (208) 528-2650

State DEQ Office                              (208) 373-0502

Website: <http://www2.state.id.us/deq>

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at 1-800-962-3257 for assistance with protection strategies.

# POTENTIAL CONTAMINANT INVENTORY

## LIST OF ACRONYMS AND DEFINITIONS

**AST (Aboveground Storage Tanks)** – Sites with above-ground storage tanks

**Business Mailing List** – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

**CERCLIS** – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund® is designed to clean up hazardous waste sites that are on the national priority list (NPL).

**Cyanide Site** – DEQ permitted and known historical sites/facilities using cyanide.

**Dairy** – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

**Deep Injection Well** – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of storm water runoff or agricultural field drainage.

**Enhanced Inventory** – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (IDEQ) during the primary contaminant inventory.

**Floodplain** – This is a coverage of the 100year floodplains.

**Group 1 Sites** – These are sites that show elevated levels of contaminants and are not within the priority one areas.

**Inorganic Priority Area** – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

**Landfill** – Areas of open and closed municipal and non-municipal landfills.

**LUST (Leaking Underground Storage Tank)** – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

**Mines and Quarries** – Mines and quarries permitted through the Idaho Department of Lands.)

**Nitrate Priority Area** – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

**NPDES (National Pollutant Discharge Elimination System)** – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

**Organic Priority Areas** – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

**Recharge Point** – This includes active, proposed, and possible recharge sites on the Snake River Plain.

**RICRIS** – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

**SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities)** – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

**Toxic Release Inventory (TRI)** – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

**UST (Underground Storage Tank)** – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

**Wastewater Land Applications Sites** – These are areas where the land application of municipal or industrial wastewater is permitted by IDEQ.

**Wellheads** – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

**NOTE:** Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

## References Cited

EPA (U.S. Environmental Protection Agency), 1997, State Methods for Delineating Source Water Protection Areas for Surface Water Supplied Sources of Drinking Water, EPA 816-R-97-008, 40p.

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997, "Recommended Standards for Water Works".

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Idaho Department of Environmental Quality, 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Environmental Quality, 1999, Idaho Source Water Assessment Plan.

Idaho Division of Environmental Quality, 1993, Sanitary Survey for Challis, City of, Eastern Idaho Regional Office.

U.S. Government Printing Office, 1995, Code of Federal Regulations, 40 CFR 112, Appendix C-III, Calculation of the Planning Distance.

Attachment A  
City of Challis  
Garden Creek Intake  
Susceptibility Analysis

The final scores for the susceptibility analysis were determined from the addition of the Potential Contaminant Source/Land Use Score and Source Construction Score.

Final Susceptibility Scoring:

0 - 7    Low Susceptibility

8 - 15   Moderate Susceptibility

$\geq 16$    High Susceptibility

## Surface Water Susceptibility Report

Public Water System Name :

CHALLIS CITY OF  
7190013

Well# : GARDEN CREEK

10/16/2000 12:10:00 PM

## 1. System Construction

SCORE

Intake structure properly constructed	NO	1
Infiltration gallery or well under the direct influence of Surface Water	NO	2

Total System Construction Score 3

## 2. Potential Contaminant Source / Land Use

IOC Score	VOC Score	SOC Score	Microbial Score
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Predominant land use type (land use or cover)	BASALT FLOW, UNDEVELOPED, OTHER	0	0	0	0
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Farm chemical use high	NO	0	0	0	
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Significant contaminant sources *	YES	1 mile upstream is a bridge (IOC, VOC, SOC, Microbes)			
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Sources of class II or III contaminants or microbials present within the 500' of the intake and the		7	2	0	0
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Agricultural lands within 500 feet	YES				
Less than 25% Irrigated Agriculture		0	0	0	0

Three or more contaminant sources	NO	0	0	0	0
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Sources of turbidity in the watershed	YES	1	1	1	1
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Total Potential Contaminant Source / Land Use Score 9 5 1 1

## 3. Final Susceptibility Source Score

12 8 4 4

## 4. Final Source Ranking

Moderate Moderate Low Low

\* Special consideration due to significant contaminant sources  
Source is considered High Susceptibility